WHAT IS CLAIMED:

1. A terpolymer consisting essentially of tyrosine, alanine and lysine randomly polymerized into a polypeptide.

2. The terpolymer of Claim 1 which is substantially free of glutamic acid.

3. The terpolymer of Claim 1 wherein said tyrosine is present in a mole fraction of about 0.005 to about 0.250; said alanine is present in a mole fraction of about 0.3 to about 0.6; and lysine is present in a mole fraction of about 0.1 to about 0.5.

4. The terpolymer of Claim 1 wherein said tyrosine is present in a mole fraction of about 0.10, said alanine is present in a mole fraction of about 0.54, and said lysine is present in a mole fraction of about 0.35.

5. A terpolymer consisting essentially of glutamic acid, tyrosine and lysine randomly polymerized into a polypeptide.

6. The terpolymer of Claim 5 which is substantially free of alanine.

7. The terpolymer of Claim 5 wherein said glutamic acid is present in a mole fraction of about 0.005 to about 0.300; said tyrosine is present in a mole fraction of about 0.005 to about 0.250; and said lysine is present in a mole fraction of about 0.3 to about 0.7.

8. The terpolymer of Claim 5 wherein said glutamic acid is present in a mole fraction of about 0.26, said tyrosine is present in a mole fraction of about 0.16 and said lysine is present in a mole fraction of about 0.58.

9. A terpolymer consisting essentially of glutamic acid, alanine and lysine

randomly polymerized into a polypeptide.

10. The terpolymer of Claim 9 which is substantially free of tyrosine.

11. The terpolymer of Claim 9, wherein said glutamic acid is present in a mole fraction of about 0.005 to about 0.300; said alanine is present in a mole fraction of about 0.005 to about 0.600; and said lysine is present in a mole fraction of about 0.2 to about 0.7.

12. The terpolymer of Claim 9 wherein said glutamic acid is present in a mole fraction of about 0.15, said alanine is present in a mole fraction of about 0.48 and said lysine is present in a mole fraction of about 0.36.

13. A terpolymer consisting essentially of tyrosine, glutamic acid and alanine randomly polymerized into a polypeptide, wherein said tyrosine is present in a mole fraction of about 0.005 to about 0.250; said glutamic acid is present in a mole fraction of about 0.005 to about 0.300, and said alanine is present in a mole fraction of about 0.005 to about 0.800.

14. The terpolymer of Claim 13 wherein said tyrosine is present in a mole fraction of about 0.14, said glutamic acid is present in a mole fraction of about 0.21, and said alanine is present in a mole fraction of about 0.65.

15. The terpolymer of Claim 13 which is substantially free of tyrosine.

16. A pharmaceutical composition for the treatment of an autoimmune disease, comprising a therapeutically effective amount of a terpolymer comprising three different amino acids randomly polymerized into a polypeptide, and a pharmaceutically acceptable carrier, wherein said three different amino acids are selected from the group of tyrosine, glutamic acid, alanine and lysine.

17. The pharmaceutical composition of Claim 16 wherein said terpolymer consists essentially of tyrosine, alanine and lysine.

18. The pharmaceutical composition of Claim 17 wherein said terpolymer is substantially free of glutamic acid.

19. The pharmaceutical composition of Claim 17 wherein said tyrosine is present in a mole fraction of about 0.005 to about 0.250; said alanine is present in a mole fraction of about 0.3 to about 0.6; and lysine is present in a mole fraction of about 0.1 to about 0.5.

20. The pharmaceutical composition of Claim 17 wherein said tyrosine is present in a mole fraction of about 0.10, said alanine is present in a mole fraction of about 0.54,and said lysine is present in a mole fraction of about 0.35.

21. The pharmaceutical composition of Claim 16 wherein said terpolymer consists essentially of glutamic acid, tyrosine and lysine.

22. The pharmaceutical composition of Claim 21 wherein said polypeptide is substantially free of alanine.

23. The pharmaceutical composition of Claim 21 wherein said glutamic acid is present in a mole fraction of about 0.005 to about 0.300; said tyrosine is present in a mole fraction of about 0.005 to about 0.250; and said lysine is present in a mole fraction of about 0.3 to about 0.7.

24. The pharmaceutical composition of Claim 21 wherein said glutamic acid is present in a mole fraction of about 0.26, said tyrosine is present in a mole fraction of about 0.16 and said lysin is present in a mole fraction of about

0.58.

25. The pharmaceutical composition of Claim 16 wherein said terpolymer consists essentially of glutamic acid, alanine and lysine.

26. The pharmaceutical composition of Claim 25 wherein said polypeptide is substantially free of tyrosine.

27. The pharmaceutical composition of Claim 25, wherein said glutamic acid is present in a mole fraction of about 0.005 to about 0.300; said alanine is present in a mole fraction of about 0.005 to about 0.600; and said lysine is present in a mole fraction of about 0.2 to about 0.7.

28. The pharmaceutical composition of Claim 25 wherein said glutamic acid is present in a mole fraction of about 0.15, said alanine is present in a mole fraction of about 0.48 and said lysine is present in a mole fraction of about 0.36.

29. The pharmaceutical composition of Claim 16 wherein said terpolymer consists essentially of tyrosine, glutamic acid and alanine, and wherein said tyrosine is present in a mole fraction of about 0.005 to about 0.250; said glutamic acid is present in a mole fraction of about 0.005 to about 0.300, and said alanine is present in a mole fraction of about 0.005 to about 0.800.

30. The pharmaceutical composition of Claim 29 wherein said tyrosine is present in a mole fraction of about 0.14, said glutamic acid is present in a mole fraction of about 0.21, and said alanine is present in a mole fraction of about 0.65.

31. The pharmaceutical composition of Claim 29 which is substantially free of

lysine.

32. The pharmaceutical composition of Claim 16 wherein said terpolymer has a molecular weight of about 2,000 to about 40,000 daltons.

33. The pharmaceutical composition of Claim 16 wherein said terpolymer has a molecular weight of about 4,000 to about 9,000 daltons.

34. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is a B cell mediated autoimmune disease.

35. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is a T cell mediated autoimmune disease.

36. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is an arthritic condition.

37. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is a demyelinating disease.

38. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is an inflammatory disease.

39. The pharmaceutical composition of Claim 16, wherein said autoimmune disease is multiple sclerosis, autoimmune hemolytic anemia, autoimmune oophoritis, autoimmune thyroiditis, autoimmune uveoretinitis, chronic immune thrombocytopenic purpura, colitis, contact sensitivity disease, diabetes mellitus, Graves disease, Guillain-Barre's syndrome, Hashimoto's disease, idiopathic myxedema, myasthenia gravis, psoriasis, pemphigus vulgaris, rheumatoid arthritis, or systemic lupus erythematosus.

40. A method for treating an autoimmune disease in a mammal which comprises administering a therapeutically effective amount of a terpolymer polypeptide comprising three different amino acids randomly polymerized into a polypeptide, wherein said three different amino acids are selected from the group of tyrosine, glutamic acid, alanine and lysine.

41. The method of Claim 40 wherein said terpolymer polypeptide consists essentially of tyrosine, alanine and lysine.

42. The method of Claim 40 wherein said terpolymer polypeptide consists essentially of glutamic acid, tyrosine and lysine.

43. The method of Claim 40 wherein said terpolymer polypeptide consists essentially of glutamic acid, alanine and lysine.

44. The method of Claim 40 wherein said terpolymer polypeptide consists essentially of tyrosine, glutamic acid and alanine, and wherein said tyrosine is present in a mole fraction of about 0.005 to about 0.250; said glutamic acid is present in a mole fraction of about 0.005 to about 0.300, and said alanine is present in a mole fraction of about 0.005 to about 0.800.

45. A method for treating an autoimmune disease which comprises administering a therapeutically effective amount of a polypeptide consisting essentially of amino acids tyrosine, glutamic acid, alanine and lysine, wherein said autoimmune disease is not multiple sclerosis.

46. The method of Claim 40 or 45, wherein said polypeptide inhibits activation of T cells.

47. The method of Claim 40 or 45, wherein said polypeptide activates T cell suppressor mechanisms.

48. The method of Claim 40, wherein said polypeptide inhibits activation of T cells responsive to myelin basic protein.

49. The method of Claim 40 or 45, wherein said polypeptide inhibits activation of T cells responsive to collagen type II peptide.

50. The method of Claim 40 or 45, wherein said polypeptide binds to a class II MHC protein.

51. The method of Claim 40 or 45, wherein said polypeptide binds to HLA-DR1.

52. The method of Claim 40 or 45, wherein said polypeptide binds to HLA-DR2.

53. The method of Claim 40 or 45, wherein said polypeptide binds to HLA-DR4.

54. The method of Claim 40 or 45, wherein said polypeptide binds to an antigen presenting cell.

55. The method of Claim 40, wherein said autoimmune disease is multiple sclerosis.

56. The method of Claim 40 or 45, wherein said autoimmune disease is autoimmune hemolytic anemia, autoimmune oophoritis, autoimmune thyroiditis, autoimmune uveoretinitis, chronic immune thrombocytopenic purpura, colitis, contact sensitivity disease, diabetes mellitus, Graves disease, Guillain-Barre's syndrome, Hashimoto's disease, idiopathic myxedema, myasthenia gravis, psoriasis, pemphigus vulgaris, rheumatoid arthritis, or

systemic lupus eryth matosus.

57. The method of Claim 40 or 45, wherein said polypeptide has a molecular weight of about 2,000 to about 40,000 daltons.

58. The method of Claim 40 or 45, wherein said polypeptide has a molecular weight of from about 4,000 to about 12,000 daltons.

59. A synthetic peptide having an amino acid sequence comprising at least three amino acids selected from the group of amino acids consisting of aromatic amino acids, negatively charged amino acids, positively charged amino acids, and aliphatic amino acids, wherein the synthetic peptide is at least seven amino acid residues in length and is capable of binding to an MHC class II protein associated with an autoimmune disease.

60. The synthetic peptide of Claim 59 in which the aromatic amino acid is selected from the group consisting of tyrosine, valine, and phenylalanine.

61. The synthetic peptide of Claim 59, in which the positively charged amino acid is lysine, and the sequence comprises

lysine-tyrosine; lysine-valine; or lysine-phenylalanine.

62. The synthetic peptide of Claim 59, wherein the negatively charged amino acid is glutamic acid, and the sequence comprises

glutamic acid-lysine-tyrosine;
glutamic acid-lysine-valine; or
glutamic acid-lysine-phenylalanine.

63. The synthetic peptide of Claim 59, wherein the aliphatic amino acid is alanine, and the sequence comprises

glutamic acid -lysine-tyrosine-alanine;

glutamic acid-lysine-valine-alanine; or

glutamic acid-lysine-phenylalanine-alanine.

64. The synthetic peptide of Claim 59, wherein the sequence comprises an amino-terminal alanine, and

alanine-glutamic acid-lysine-tyrosine-alanine;

alanine-glutamic acid-lysine-valine-alanine; or

alanine-glutamic acid-lysine-phenylalanine-alanine.

65. The synthetic peptide of Claim 59, wherein the aliphatic amino acid is alanine and the sequence comprises

lysine-glutamic acid-tyrosine-alanine;

lysine-tyrosine-alanine-glutamic acid;

lysine-glutamic acid-valine-alanine;

lysine-valine-alanine-glutamic acid;

lysine-glutamic acid-phenylalanine-alanine; or

lysine-phenylalanine-alanine-glutamic acid.

66. The synthetic peptide of Claim 59, wherein the aliphatic amino acid is alanine and the sequence comprises

lysine-tyrosine-alanine-alanine;

lysine-lysine-tyrosine-alanine;

lysine-valine-alanine-alanine;

lysine-lysine-valine-alanine;

lysine-phenylalanine-alanine-alanine; or

lysine-lysine-phenylalanine-alanine.

67. The synthetic peptide of Claim 59, wherein the peptide further comprises two alanine r sidues and the sequenc comprises

alanine-lysine-tyrosine-alanine-glutamic acid;
glutamic acid-alanine-lysine-tyrosine-alanine;
alanine-lysine-valine-alanine-glutamic acid;
glutamic acid-alanine-.lysine-valine-alanine;
alanine-lysine-phenylalanine-alanine-glutamic acid; or
glutamic acid-alanine-lysine-phenylalanine-alanine.

68. The synthetic peptide of Claim 64, wherein the autoimmune disease is an arthritic condition.

69. The synthetic peptide of Claim 68, wherein the arthritic condition is rheumatoid arthritis.

70. A composition according to Claim 59 wherein the peptide is 7-100 amino acid residues in length.

71. A composition which is a synthetic peptide having therapeutic activity in a subject suffering from an autoimmune disease, the amino acid sequence of said peptide having at least one of each of amino acids glutamic acid, lysine, and alanine and an amino acid selected from the group consisting of tyrosine, valine, and phenylalanine.

72. A composition according to Claim 71 wherein the peptide is 7-100 amino acids in length.

73. A composition according to Claim 71 wherein the peptide is 7-50 amino acids in length.

74. A composition according to Claim 69 wherein the peptide is 7-25 amino acids in length.

75. A composition according to Claim 69 wherein the peptide is 7-15 amino acids in length.

76. A composition according to Claim 59 formulated as a unitary dosage in a pharmaceutically acceptable carrier.

77. A composition according to Claim 59 which is substantially pure.

78. A composition according to Claim 59 having greater affinity for the antigen binding groove of an MHC class II protein associated with the autoimmune disease than a type II collagen 261-273 peptide.

79. A composition according to Claim 71 comprising amino acid analogs at residue locations and in amounts sufficient to inhibit protease degradation of the peptide in the subject.

80. An isolated peptide composition having a sequence selected from the group consisting of: AKEYAAAAAAKAAAA (SEQ ID NO: 25), AAEYAAAAAAKAAAA (SEQ ID NO: 26), AAKYAEAAAAKAAAA (SEQ ID NO: 27), and EAKYAAAAAAKAAAA (SEQ ID NO: 28).

81. An isolated peptide according to any of the peptides of Claim 80 in which the tyrosine (Y) has been substituted by a valine (V) or a phenylalanine (F).

82. An isolated peptide composition having a sequence selected from the group consisting of: AEKYAAAAAAKAAAA (SEQ ID NO: 29), AKEYAAAAAAKAAAA (SEQ ID NO: 25), KEAYAAAAAAKAAAA (SEQ ID NO: 30), AEEYAAAAAAKAAAA (SEQ ID NO: 31), AAEYAAAAAAKAAAA (SEQ ID NO: 26), EKAYAAAAAAKAAAA (SEQ ID NO: 32), AAKYEAAAAAKAAAA (SEQ ID

NO: 33), AAKYAEAAAAKAAAA (SEQ ID NO: 27), EAAYAAAAAAKAAAA (SEQ ID NO: 34), EKKYAAAAAAKAAAA (SEQ ID NO: 35), EAKYAAAAAAKAAAA (SEQ ID NO: 28), AKKYEAAAAAAAAAA (SEQ ID NO: 55), AAEYKAAAAAAAAAA (SEQ ID NO: 37), AAKYEAAAAAAAAAA (SEQ ID NO: 38), AAKYAEAAAAAAAAA (SEQ ID NO: 39), AEYAKAAAAAAAAAA (SEQ ID NO: 40), AEKAYAAAAAAAAAA (SEQ ID NO: 41), AYKAEAAAAAAAAAA (SEQ ID NO: 42), and AKYAEAAAAAAAAAA (SEQ ID NO: 43), the peptide having high affinity for an MHC class II protein.

83. An isolated peptide according to any of the sequences of Claim 82 in which the tyrosine (Y) has been substituted by a valine (V) or a phenylalanine (F).

84. An isolated peptide composition having an amino acid sequence capable of inhibiting an immune response in a subject to an autoantigen, wherein a position in the amino acid sequence of the peptide that corresponds to an antigen binding pocket in a peptide binding groove of an MHC class II DR protein is identified as a particular amino acid.

85. An isolated peptide composition according to Claim 84 wherein the autoantigen is associated with a condition selected from the group consisting of multiple sclerosis and arthritis.

86. An isolated peptide composition according to Claim 84, wherein the MHC class II protein is selected from the group consisting of an MHC class II HLA-DR1 protein, and an MHC class II HLA-DR4 protein.

87. An isolated peptide composition according to Claim 84, wherein the MHC class II protein is an MHC class II HLA-DR2 protein.

88. An isolated p ptide composition according to Claim 84, wherein the amino

acid residue in the position of the sequence that corresponds to the P1 pocket in the MHC class II peptide binding groove is selected from the group consisting of a tyrosine, a valine, and a phenylalanine.

89. An isolated peptide composition according to Claim 84, wherein the amino acid residue in a first amino acid position of the sequence that corresponds to the P1 pocket in the MHC class II peptide binding groove is alanine.

90. An isolated peptide composition according to Claim 84, wherein the amino acid residue located eight residues beyond the first amino acid position of the sequence that corresponds to the P1 pocket in the MHC class II peptide binding groove is selected from the group consisting of lysine and alanine.

91. A pharmaceutical preparation comprising a first peptide sequence and a second peptide sequence, wherein the preparation is a mixture of a first peptide and a second peptide of different amino acid sequences both according to Claim 84 in a pharmaceutically acceptable carrier, the first sequence having in addition a lysine residue and the second sequence having an alanine residue at the amino acid position eight residues beyond the amino acid corresponding to the P1 pocket in the MHC class II peptide binding groove.

92. A method of treating a subject having an autoimmune disease, comprising:
(a) selecting a therapeutic agent comprising a synthetic heteropolymer having at least two different amino acids, a first being an amino acid which is charged and a second being an amino acid which is hydrophobic, the amino acids being polymerized in a linear configuration, and a pharmaceutically acceptable carrier; and
(b) administering the therapeutic agent to the subject having the autoimmune disease;

with the proviso that when the autoimmune dis ase is multiple sclerosis the synthetic heteropolymer is other than Copolymer 1.

93. A method according to Claim 92, wherein in step (a) the charged amino acid is selected from the group consisting of lysine, glutamic acid, and aspartic acid.

94. A method according to Claim 92, comprising in step (a) having a third amino acid which is selected from the group of charged amino acids, the third amino acid being a different amino acid from the second amino acid.

95. A method according to Claim 92, wherein the hydrophobic amino acid is selected from the group consisting of valine, leucine, isoleucine, alanine, phenylalanine, and tyrosine.

96. A method according to Claim 95, wherein the heteropolymer comprises the amino acids lysine, alanine, and tyrosine.

97. A method according to Claim 95, wherein the heteropolymer comprises the amino acids lysine, glutamic acid, alanine, and phenylalanine.

98. A method according to Claim 95, wherein in the heteropolymer comprises the amino acids lysine, glutamic acid, alanine, and valine.

99. A method according to Claim 96, wherein the heteropolymer of step (a) contains lysine, alanine, and tyrosine polymerized in a molar ratio of at least 3 moles of lysine per mole of tyrosine, and at least 4 moles of alanine per mole of tyrosine.

100. A method according to Claim 99, wherein the molar ratio of lysine : alanine :

tyrosine is 4.0 : 5.0 : 1.0.

101. A method according to Claim 95, wherein the heteropolymer of step (a) contains the amino acids glutamic acid : lysine : alanine polymerized in a molar ratio of 1.5 : 4.0 : 5.0.

102. A method according to Claim 93, wherein the heteropolymer contains the amino acids glutamic acid : alanine : tyrosine polymerized in a molar ratio of 1.5 : 5.0 : 1.0.

103. A method according to Claim 93, wherein the heteropolymer contains the amino acids glutamic acid : lysine : tyrosine polymerized in a molar ratio of 1.5 : 4.0 : 1.0.

104. A method according to Claim 92, wherein step (a) further comprises selecting the heteropolymer that inhibits binding of an antigenic peptide to an MHC class II protein.

105. A method according to Claim 92, wherein step (a) further comprises selecting the heteropolymer that inhibits class II-specific T cell responses to an MHC class II protein-peptide complex.

106. A method according to Claim 104, wherein the antigenic peptide is associated with an autoimmune disease.

107. A method according to Claim 105, wherein the MHC class II protein is associated with an autoimmune disease.

108. A method according to Claim 92, wherein step (b) further comprises supplementing the combined heteropolymer and carrier with at l ast an

additional th rapeutic agent.

109. A method according to Claim 108, wherein step (b) further comprises selecting the additional therapeutic agent from the group consisting of an antibody, an enzyme inhibitor, an antibacterial agent, an antiviral agent, a steroid, a nonsteroidal anti-inflammatory agent, an antimetabolite, a cytokine, and a soluble cytokine receptor.

110. A method according to Claim 108, wherein step (b) further comprises selecting an additional therapeutic agent that is an inducer of synthesis of a cytokine in a subject.

111. A method according to Claim 109, wherein step (b) further comprises selecting a cytokine from the group consisting of interferon-β, interleukin-4 and interleukin-10.

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112. A method according to Claim 109, wherein step (b) further comprises selecting an enzyme inhibitor from the group consisting of a protease inhibitor and a cyclooxygenase inhibitor.

113. A method according to Claim 108, wherein step (a) further comprises selecting the pharmaceutically acceptable carrier as suitable for administration to the subject by a route selected from the group consisting of intravenous, intramuscular, intraperitoneal, subcutaneous, oral, and transdermal administration.

114. A method of making a therapeutic heteropolymer composition, comprising:
(a) selecting three or more amino acids from the group consisting of charged amino acids, aliphatic amino acids, and aromatic amino acids;
(b) polymerizing th amino acids selected in step (a) into a heteropolymer

having a random linear configuration;

(c) obtaining the heteropolymer in step (b) that inhibits binding of an antigenic peptide to an MHC class II protein; and

(d) formulating in a pharmaceutically acceptable carrier, the heteropolymer that inhibits binding of an antigenic peptide to an MHC class II protein, to obtain a therapeutic heteropolymer composition.

115. A method according to Claim 114, wherein step (c) further comprises obtaining the heteropolymer that inhibits binding of an antigen which is an autoantigen to an MHC class II protein.

116. A method according to Claim 115, wherein the autoantigen in step (c) is collagen type II peptide 261-273 and the class II MHC protein is MHC HLA-DR1 or MHC HLA-DR4.

117. A method according to Claim 115, wherein the autoantigen in step (c) is myelin basic protein peptide 84-102 and the class II MHC protein is MHC HLA-DR2.

118. A method according to Claim 116, wherein step (c) further comprises obtaining the heteropolymer that, at a concentration of 1.5 micromolar, inhibits 50% binding of collagen type II peptide 261-273, at a concentration of at least 20 micromolar, to a class II MHC HLA-DR1 or MHC HLA-DR4 protein.

119. A method according to Claim 117, wherein step (c) further comprises obtaining the heteropolymer that, at a concentration of 1.5 micromolar, inhibits 50% binding of myelin basic protein peptide 84-102, at a concentration of at least 20 micromolar, to a class II MHC HLA-DR2 protein.

120. A method according to Claim 114, comprising prior to st p (a) the additional

step of producing the class II MHC protein recombinantly in a non-mammalian cell.

121. A method for obtaining an MHC class II binding motif amino acid sequence in a mixture of synthetic peptide heteropolymers having therapeutic activity in a subject, comprising:

(a) binding the mixture of synthetic heteropolymers to MHC class II protein molecules to form heteropolymer-MHC protein complexes;

(b) removing by peptidase enzyme digestion the amino terminal amino acid residues of the heteropolymers protruding from the heteropolymer-MHC protein complex to align amino termini of the heteropolymers to the edge of the MHC protein complexes; and

(c) eluting the aligned heteropolymers from the MHC protein by dissociating the complexes to release the amino terminal aligned heteropolymers having the binding motif.

122. A method according to Claim 121 wherein an additional step (d) comprises determining the amino terminal sequence of the aligned heteropolymers, to identify the binding motif.

123. A method according to Claim 122 wherein an additional step (e) comprises comparing the amino terminal sequence of the aligned heteropolymers to the amino acid sequence of the synthetic heteropolymer composition.

124. A method according to Claim 121, wherein the MHC class II protein is associated with an autoimmune disease.

125. A method according to Claim 124, wherein the autoimmune disease is an arthritic condition or a demyelinating condition.

126. A method according to Claim 122, wherein an additional step (e) comprises synthesizing a plurality of peptide preparations, each peptide preparation having a binding motif amino acid sequence.

127. A method according to Claim 126 wherein an additional step (f) comprises determining the affinity of each of the synthesized peptides for the MHC class II protein.

128. A method for treating a subject having an arthritic condition, comprising:

obtaining a therapeutic composition which is a pure heteropolymer comprised of amino acids; and

administering the composition in an effective dosage to the subject, such that the arthritic condition is remediated.

129. A method according to Claim 128, wherein the effective dosage is at least 5 mg per day.

130. A method according to Claim 128, wherein the effective dosage is at least 10 mg per day.

131. A method according to Claim 128, wherein the effective dosage is at least 15 mg per day.

132. A method according to Claim 128, wherein the effective dosage is at least 20 mg per day.

133. A method according to Claim 128, wherein the effective dosage is substantially in the range of 25 to 400 μg per kg of the subject per day.

134. A kit for assaying the binding of an analyte to an MHC prot in, comprising a

water-soluble MHC protein which has been recombinantly produced in a non-mammalian cell, a reaction chamber for containing the analyte and the MHC protein, means for detecting binding of the analyte to the MHC protein, a container, and instructions for use.

135. A kit according to Claim 134, wherein the MHC protein is an MHC class II protein selected from the group consisting of an MHC class II HLA-DR1, an MHC class II HLA-DR2 and an MHC class II HLA-DR4 protein.

136. A kit according to Claim 134, comprising in addition an autoantigenic peptide.

137. A pharmaceutical composition for the treatment of an autoimmune disease, comprising a therapeutically effective amount of an isolated copeptide selected from the group consisting of

SEQ ID NO: 4, SEQ ID NO: 5, SEQ ID NO: 6, SEQ ID NO: 7,
SEQ ID NO: 8, SEQ ID NO: 9, SEQ ID NO: 10, SEQ ID NO: 11,
SEQ ID NO:12, SEQ ID NO: 13, SEQ ID NO: 14, SEQ ID NO: 15,
SEQ ID NO: 16, SEQ ID NO: 17, SEQ ID NO: 18 SEQ ID NO: 19,
SEQ ID NO: 20, SEQ ID NO: 21, SEQ ID NO: 22, SEQ ID NO: 23,
SEQ ID NO: 24, SEQ ID NO: 25, SEQ ID NO: 26, SEQ ID NO: 27,
SEQ ID NO: 28, SEQ ID NO: 29, SEQ ID NO: 30, SEQ ID NO: 31,
SEQ ID NO: 32, SEQ ID NO: 33, SEQ ID NO: 34, SEQ ID NO: 35,
SEQ ID NO: 36, SEQ ID NO: 37, SEQ ID NO: 38, SEQ ID NO: 39,
SEQ ID NO: 40, SEQ ID NO: 41, SEQ ID NO: 42, SEQ ID NO: 43,
SEQ ID NO: 45, SEQ ID NO: 46, SEQ ID NO: 47, SEQ ID NO: 48,
SEQ ID NO: 49, SEQ ID NO: 50, SEQ ID NO: 51, SEQ ID NO: 52,
SEQ ID NO: 53, SEQ ID NO: 54, SEQ ID NO: 55, SEQ ID NO: 56, and
SEQ ID NO: 57, and a pharmaceutically acceptable carrier.

138. A pharmaceutical composition for the treatment of an autoimmune disease, comprising a therapeutically effective amount of an isolated copeptide selected from the group consisting of SEQ ID NO: 46, SEQ ID NO: 27, SEQ ID NO: 34, SEQ ID NO: 28 and SEQ ID NO: 41, and a pharmaceutically acceptable carrier.

139. A pharmaceutical composition for the treatment of an autoimmune disease, comprising a therapeutically effective amount of an isolated copeptide selected from the group consisting of SEQ ID NO: 27 and SEQ ID NO: 41.

140. A pharmaceutical composition for the treatment of an autoimmune disease, comprising a therapeutically effective amount of an isolated copeptide selected from the group consisting of SEQ ID NO: 25; SEQ ID NO: 26; SEQ ID NO: 27; and SEQ ID NO: 28, and a pharmaceutically acceptable carrier.

141. A method for treating an autoimmune disease which comprises administering a therapeutically effective amount of a copeptide selected from the group consisting of

SEQ ID NO: 4,	SEQ ID NO: 5,	SEQ ID NO: 6,	SEQ ID NO: 7,
SEQ ID NO: 8,	SEQ ID NO: 9,	SEQ ID NO: 10,	SEQ ID NO: 11,
SEQ ID NO:12,	SEQ ID NO: 13,	SEQ ID NO: 14,	SEQ ID NO: 15,
SEQ ID NO: 16,	SEQ ID NO: 17,	SEQ ID NO: 18	SEQ ID NO: 19,
SEQ ID NO: 20,	SEQ ID NO: 21,	SEQ ID NO: 22,	SEQ ID NO: 23,
SEQ ID NO: 24,	SEQ ID NO: 25,	SEQ ID NO: 26,	SEQ ID NO: 27,
SEQ ID NO: 28,	SEQ ID NO: 29,	SEQ ID NO: 30,	SEQ ID NO: 31,
SEQ ID NO: 32,	SEQ ID NO: 33,	SEQ ID NO: 34,	SEQ ID NO: 35,
SEQ ID NO: 36,	SEQ ID NO: 37,	SEQ ID NO: 38,	SEQ ID NO: 39,
SEQ ID NO: 40,	SEQ ID NO: 41,	SEQ ID NO: 42,	SEQ ID NO: 43,
SEQ ID NO: 45,	SEQ ID NO: 46,	SEQ ID NO: 47,	SEQ ID NO: 48,
SEQ ID NO: 49,	SEQ ID NO: 50,	SEQ ID NO: 51,	SEQ ID NO: 52,

SEQ ID NO: 53, SEQ ID NO: 54, SEQ ID NO: 55, SEQ ID NO: 56, and

SEQ ID NO: 57.

142. A method for treating an autoimmune disease which comprises administering a therapeutically effective amount of a copeptide selected from the group consisting of SEQ ID NO: 46, SEQ ID NO: 27, SEQ ID NO: 34, SEQ ID NO: 28 and SEQ ID NO: 41.

143. A method for treating an autoimmune disease which comprises administering a therapeutically effective amount of a copeptide selected from the group consisting of SEQ ID NO: 27 and SEQ ID NO: 41.

144. A method for treating an autoimmune disease which comprises administering a therapeutically effective amount of a copeptide selected from the group consisting of SEQ ID NO: 25; SEQ ID NO: 26; SEQ ID NO: 27; and SEQ ID NO: 28,

145. The method of any one of Claims 141-144, wherein said copeptide inhibits activation of T cells.

146. The method of any one of Claims 141-144, wherein said copeptide activation of T cell suppression mechanisms.

147. The method of any one of Claims 141-144, wherein said copeptide inhibits activation of T cells responsive to myelin basic protein.

148. The method of any one of Claims 141-144, wherein said copeptide inhibits activation of T cells responsive to collagen type II peptide.

149. The method of any one of Claims 141-144, wherein said cop ptide binds to a class II MHC protein.

150. The method of any one of Claims 141-144, wherein said copeptide binds to HLA-DR1.

151. The method of any one of Claims 141-144, wherein said copeptide binds to HLA-DR2.

152. The method of any one of Claims 141-144, wherein said copeptide binds to HLA-DR4.

153. The method of any one of Claims 141-144, wherein said copeptide binds to an antigen presenting cell.

154. The method of any one of Claims 141-144, wherein said autoimmune disease is autoimmune hemolytic anemia, autoimmune oophoritis, autoimmune thyroiditis, autoimmune uveoretinitis, chronic immune thrombocytopenic purpura, colitis, contact sensitivity disease, diabetes mellitus, Graves disease, Guillain-Barre's syndrome, Hashimoto's disease, idiopathic myxedema, multiple sclerosis, myasthenia gravis, psoriasis, pemphigus vulgaris, rheumatoid arthritis, or systemic lupus erythematosus.

155. An isolated nucleic acid encoding a copeptide consisting essentially of

SEQ ID NO: 4,	SEQ ID NO: 5,	SEQ ID NO: 6,	SEQ ID NO: 7,
SEQ ID NO: 8,	SEQ ID NO: 9,	SEQ ID NO: 10,	SEQ ID NO: 11,
SEQ ID NO:12,	SEQ ID NO: 13,	SEQ ID NO: 14,	SEQ ID NO: 15,
SEQ ID NO: 16,	SEQ ID NO: 17,	SEQ ID NO: 18	SEQ ID NO: 19,
SEQ ID NO: 20,	SEQ ID NO: 21,	SEQ ID NO: 22,	SEQ ID NO: 23,
SEQ ID NO: 24,	SEQ ID NO: 25,	SEQ ID NO: 26,	SEQ ID NO: 27,

SEQ ID NO: 28,	SEQ ID NO: 29,	SEQ ID NO: 30,	SEQ ID NO: 31,
SEQ ID NO: 32,	SEQ ID NO: 33,	SEQ ID NO: 34,	SEQ ID NO: 35,
SEQ ID NO: 36,	SEQ ID NO: 37,	SEQ ID NO: 38,	SEQ ID NO: 39,
SEQ ID NO: 40,	SEQ ID NO: 41,	SEQ ID NO: 42	SEQ ID NO: 43
SEQ ID NO: 45,	SEQ ID NO: 46,	SEQ ID NO: 47	SEQ ID NO: 48
SEQ ID NO: 49,	SEQ ID NO: 50,	SEQ ID NO: 51	SEQ ID NO: 52
SEQ ID NO: 53,	SEQ ID NO: 54,	SEQ ID NO: 55	SEQ ID NO: 56
or	SEQ ID NO: 57.		

156. A method of anyone of claims 40 or 45 wherein said autoimmune disease is rheumatoid arthritis.